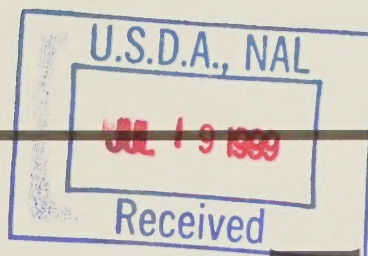


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Working Trees for Wildlife

Agricultural activities often lead to a reduction in the amount or effectiveness of wildlife habitat. Although providing quality habitat for wildlife in agricultural settings may be challenging, agroforestry offers a unique opportunity for landowners. Agroforestry technologies “put trees to work” by combining forestry and agricultural practices to make healthier, more sustainable agricultural systems.

Agroforestry practices such as windbreaks, riparian forest buffers, forest farming, alley cropping, and silvopasture, can protect crops and livestock, conserve natural resources, improve human environments and provide new sources of income. With proper planning, utilizing trees in an agricultural setting can also be an excellent way to create or improve wildlife habitat.

Agroforestry practices are often designed for a single purpose, with the assumption that they will also be adequate for wildlife. Although they usually benefit wildlife, practices often are designed far below their capability to provide the basic wildlife needs of food, water, and cover. Why not design the agroforestry practices to fulfill wildlife habitat needs first, and then incorporate traditional conservation functions as well?

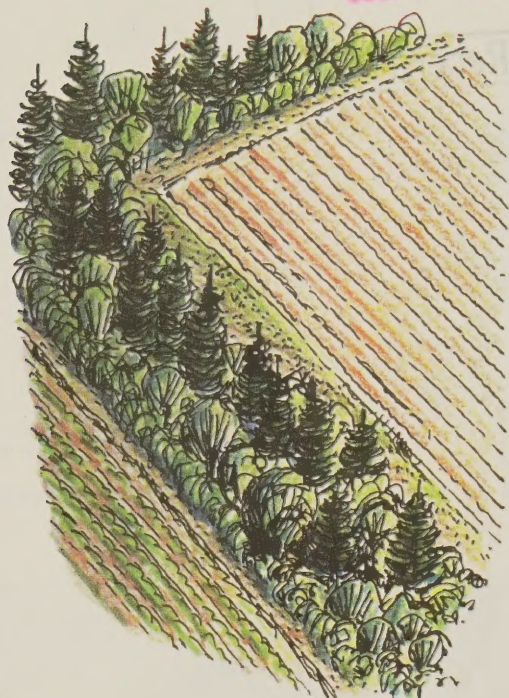


Before beginning a wildlife habitat improvement project, several things need to be considered. If certain wildlife species are desired, habitat requirements of those species should be incorporated into the plan. Soil types, topography, drainage, location of the nearest water source, adjacent land uses, and local climate need to be taken into account. The availability of food is critical, therefore, measures should be taken to provide this for wildlife, especially during the winter

months. Trees and shrubs can provide needed cover for nesting, roosting, loafing, brood rearing, escaping, and protection from the elements.

The goal of “working trees” is to protect all natural resources, including wildlife. Planting trees and shrubs, especially native plants, specifically for wildlife provides habitat while improving the health and sustainability of the agricultural system.

Windbreaks



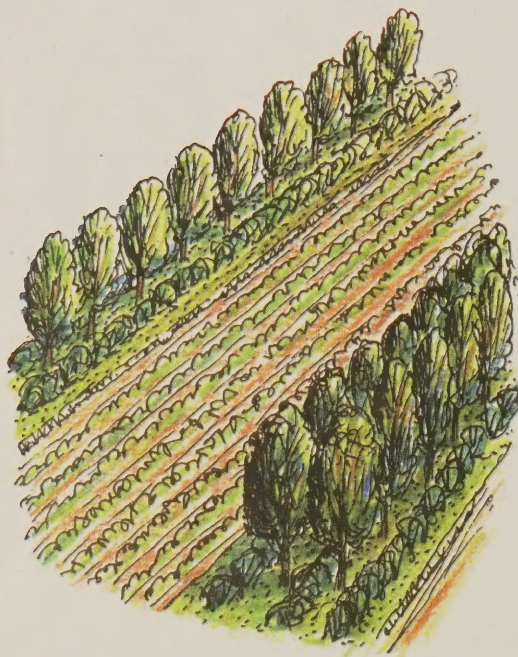
Windbreaks are multiple rows of trees and shrubs planted and managed to protect farmsteads or incorporated as part of a crop or livestock operation to enhance production, protect livestock, and control soil erosion.

When designing a windbreak for wildlife, remember to include plant species and arrangements that give desired wildlife the basic essentials of cover and food (and water, if possible.)

- ✓ Try to connect planted windbreaks to other planted or natural sources of cover, streams, ponds, or windmills. If the windbreak cannot be designed to connect, plant travel lanes to connect to other food, cover or water sources.
- ✓ If drifting snow is a problem, plant a "trip row" of shrubs 50 to 100 feet away on the windward side, to help keep snow out of the windbreak. This will also provide additional low-level cover.
- ✓ Plant food plots alongside the windbreak or leave a few rows of standing crops. Cultivating a strip to let native annual plants grow (some people call them weeds) can be a good source of food and cover.
- ✓ Remember, generally speaking, wider plantings are better. A single-row windbreak is less valuable to wildlife than multiple rows. The ultimate might be 20 rows of trees and shrubs up to 300 feet wide. However, few people are willing to give up this much land or maintain this large of a planting.
- ✓ Try to mix different yet compatible plants in the rows to give a natural "feel" to the windbreak. Or, better yet, plant connected groupings of five to seven trees and shrubs. You'll end up with a block planting that resembles a native woodland.

When these design principles are followed, windbreaks designed for wildlife will also protect crops, homes, livestock, or roads with little or no decrease in protection capability.

Alley Cropping



Alley cropping is growing an agricultural crop simultaneously with a long-term tree crop to provide annual income while the tree crop matures. Fine hardwoods like walnut, oak, ash, and pecan are favored species in alley cropping systems and can potentially provide high-value lumber or veneer logs. Nut crops can be another intermediate product.

Alley cropping systems are designed primarily to grow crops between rows of high value trees until they are harvested or the crops are shaded out. The following modifications will benefit wildlife:

- ✓ Rather than clean till or apply chemicals, use ground covers in the tree row areas that are attractive food/cover sources for wildlife, e.g. Desmodiums or clovers are nitrogen-fixing plants that benefit wildlife as well.
- ✓ Plant fruit-bearing shrubs between or adjacent to the trees. Plants with fruit lasting long into the winter are excellent choices.
- ✓ Instead of single tree rows, plant two or three rows of trees between crop rows, creating wider strips of trees between crop alleys. This will add to the cover capability of the planting.
- ✓ With proper planning, the tree rows can be utilized as travel lanes to connect other food, cover, or water sources. The added shrub rows and ground cover will enhance wildlife capacity.
- ✓ A farm operator can leave one to two rows of crop next to the tree rows to provide winter food.

Alley cropping is an intensively managed system that benefits wildlife. With a little ingenuity and foresight, adding native plant components can increase the attraction of desired wildlife species.

Planning your Practices to Include *Wildlife*

All wildlife require food, water, and places for protection within reasonable proximity to each other. With awareness of these basic needs, you can plan and implement practices that will attract wildlife and provide them with a suitable home.

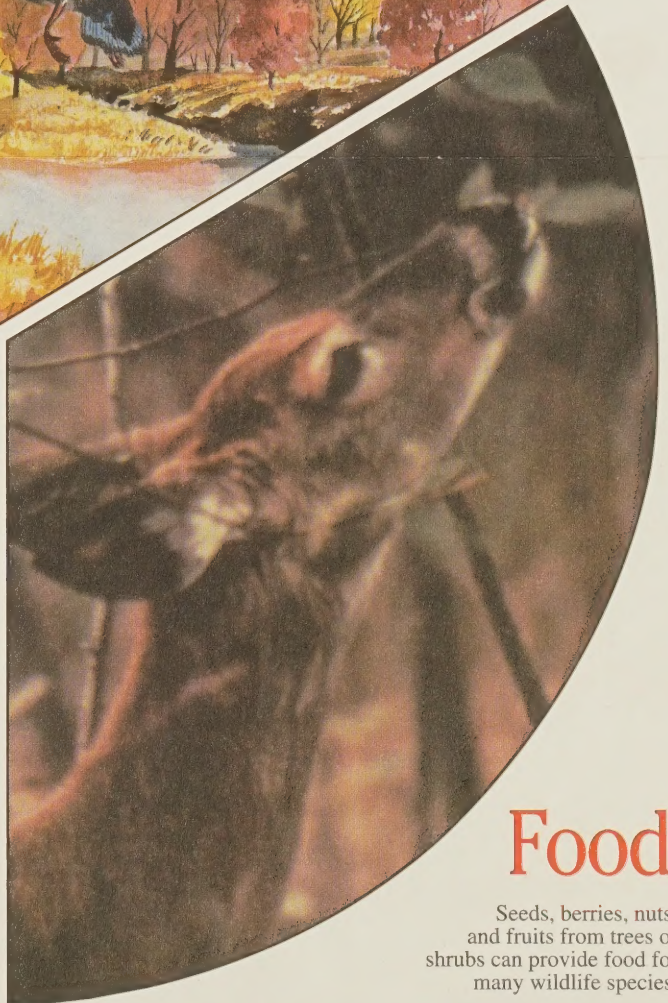
Water

Farm ponds and wetlands provide life-giving water for birds and animals. Agroforestry practices can provide travel lanes for access to water sources.



Food

Seeds, berries, nuts, and fruits from trees or shrubs can provide food for many wildlife species.



Cover

Trees, shrubs, and ground cover provide protection from predators and shelter from winter cold and summer heat.



Silvopasture

Silvopasture combines trees with forage and livestock production. The trees are managed for high-value sawlogs and at the same time provide shade and shelter for livestock and forage, reducing stress and sometimes increasing forage production.

In silvopastoral systems, the forest understory is manipulated to meet forage needs for livestock and are typically less diverse than the natural forest understory or natural ecosystem. To maximize the benefits to wildlife, the needs of the wildlife species desired must also be considered when designing the system.

- ✓ **Wildlife allocation of resources:** The amount and type of understory needed for wildlife must be determined. These resources should be protected for use by the wildlife species desired.
- ✓ **Canopy management:** The amount of light penetration through the canopy must be regulated to allow for the production of forage and other understory plants. Canopy management can also allow a percentage of the canopy tree species to be trees that meet the needs of wildlife rather than the timber crop. In this way canopy management will influence both density and species diversity.
- ✓ **Grazing management:** Manipulation of the understory is done principally through grazing management. The timing, intensity, and duration of grazing to protect the resources allocated for wildlife become key elements in the grazing management plan. Prescribed grazing, prescribed burning, rotational systems, and rest periods are elements of the grazing plan that may be required to manage the understory to achieve wildlife objectives.

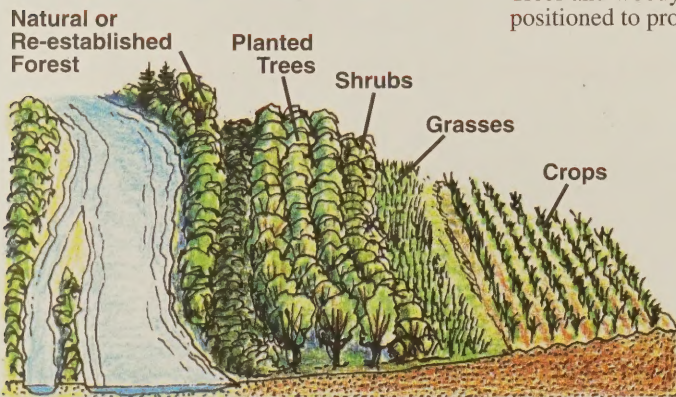
It must be recognized that silvopastoral systems generally meet the habitat requirements of specialized wildlife species, due to the constraints of a silvopasture.



Riparian Forest Buffers

Riparian Forest Buffers are natural or re-established forests along waterways, made up of tree, shrub, and grass plantings designed to buffer and filter non-point source pollution of waterways by runoff from adjacent land. They also reduce bank erosion, protect aquatic environments, enhance wildlife and increase biodiversity.

Trees and woody vegetation near streams, wetlands, or ponds are uniquely positioned to provide habitat for both terrestrial and aquatic wildlife.



- ✓ As with other agroforestry practices designed to encourage wildlife, a diversity of plant species will provide the best habitat for a large number of wildlife species.
- ✓ Native plant species should be encouraged, as wildlife are familiar with them and are adapted to their use.
- ✓ Tall streamside trees with spreading canopies provide shade, food, and in-stream woody structure for fish species.
- ✓ The width of the buffer and the plant species used will depend on the type of wildlife desired.

What About Forest Farming?

In forest farming, high-value specialty crops are cultivated under the protection of a forest canopy that has been modified to provide the correct shade level. Crops like ginseng, shiitake mushrooms, and decorative ferns are sold for medicinal, culinary, or ornamental uses. Forest farming provides income while high-value trees are being grown for wood products.

According to forest farming experts, small rodents and certain birds tend to be “problem” wildlife. By providing a habitat that attracts birds and animals that prey on these pests may benefit both the farmer and preying species. Species that could help control

pest populations in a forest farming area include: fox, coyote, hawk, owl, shrew, bat, mink, weasel, and many beneficial insects.

Additionally, planting good food sources and cover nearby, specifically designed to attract unwanted wildlife may benefit both farmer and wildlife, giving birds, animals, and insects an attractive habitat that may distract them from the forest farming planting.

Depending on the understory crop, precautions should be taken to protect it from damaging wildlife like turkey and deer as well as small rodents. Different fencing arrangements, including below-ground fences to block burrowing rodents and electric fences are typical pest management practices.

Planning for Wildlife . . .

"Working trees" can provide wildlife habitat in the agricultural landscape but landowners must know how to apply these principles to their agroforestry practice design.

Horizontal Structure

Vegetation chosen for planting should be arranged to provide the greatest width practical and transition smoothly into the adjoining land use. For instance, instead of a row of shrubs placed next to a

crop field, plant a strip of native grass between the shrubs and crops.

Horizontal structure can also be improved by using clump plantings under a tree canopy or along the outside edge.

Minimize straight lines in the design, if possible.



Reliable Food Sources



The availability of food is critical, especially during winter months when energy needs of birds and animals are greatest. Planting trees and shrubs that keep their fruit during the winter is essential in areas where snow accumulation can make foraging difficult.

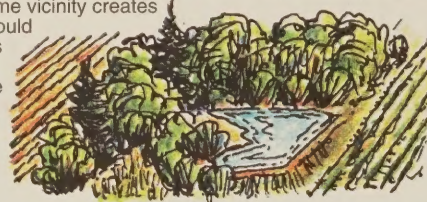
Vertical Structure

Vegetation heights should vary from tall trees to medium size trees and shrubs to lower growing grasses and forbs. Vertical structure is most important for birds, as different species use different layers for nesting, roosting, feeding, or loafing.



Placement Within Landscape

Placement of agroforestry practices within the larger landscape, known as juxtaposition, is important in determining habitat value for wildlife. Food, cover and water located in the same vicinity creates optimal habitat. Designs should consider the wildlife species and their normal range of mobility. For example, if the desired species seldom feeds more than 200 yards from escape cover, it does little good to provide cover a half mile from the food.

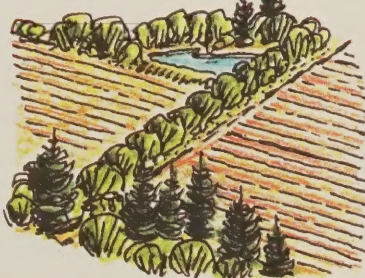


Width



The width of tree and shrub plantings depends on the agroforestry practice being applied, the wildlife species the landowner wants to attract, and the acreage the landowner wishes to commit to working trees. Proper vertical and horizontal structure benefits most edge-loving wildlife. Increased width along riparian areas provides habitat enhancement for both aquatic and terrestrial species. Generally speaking, "the wider, the better."

Travel Lanes



The addition of travel lanes can overcome some of the problems of isolated habitat. Woody vegetation can be used to connect several small isolated cover areas within an agricultural landscape, thus increasing the useable space for wildlife. Sometimes, the addition of such travel lanes creates complete wildlife habitat from isolated components that were formerly unusable.

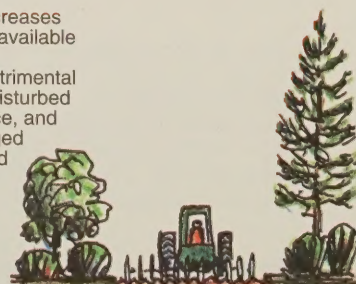
Diversity of Vegetation

The greater variety of plants, the better the chances of providing year around habitat for several wildlife species. This also reduces the possibility of losing all plants to disease, insects, or a catastrophic event. Consider coniferous and deciduous trees and shrubs, fall and spring fruiting varieties, perennial and annual herbaceous vegetation, and a variety of flowering dates. Try to use native plants when possible because wildlife are already familiar with them and these plants are adapted to the local climate.

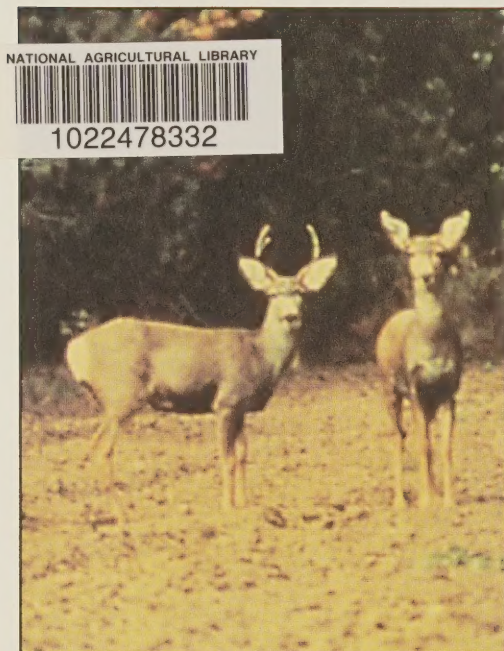


Disturbance

On most sites, disturbance increases the amount and kind of plants available for wildlife. Most sites require disturbance, while it can be detrimental to others. Vegetation can be disturbed naturally by fire, flood, wind, ice, and browsing by wildlife, or managed by disking, thinning, prescribed burning and grazing. When harvesting and thinning, consider leaving standing dead trees as homes for cavity nesters.



Other Considerations About Attracting Wildlife



Economics: Attracting wildlife to your agroforestry practice could be a way to provide income. There is potential for fee-hunting of game animals as well as opportunities to charge bird-watchers for viewing wildlife on your land.

Educational Value: Many agroforestry plantings intended to protect and provide income, can also serve as outdoor classrooms for area school children. Students can learn to identify animals and plants as they learn to value the importance of balanced human and environmental interactions.

Pollination: Some agroforestry practices can improve beneficial insect pollination. A properly designed windbreak will increase bee pollination in fruit orchards.

Wildlife Hazards: It is easy to forget that it isn't always a good idea to attract wildlife to some areas. For example, when considering an agroforestry planting near an airport, it is best to avoid plants that will attract birds, due to safety reasons. Attracting deer to an area near a city or major highway is not safe for animals or humans.

Be Considerate: It is a good idea to talk with your neighbors about your plans to attract wildlife. If the animals or birds must travel through your neighbors' property to get to the habitat, they may not appreciate the intrusion, especially if they perceive the wildlife as causing damage.

Pest Control: Creating habitat for bats and certain birds that consume forest and agricultural insects could reduce the need for costly insecticides.

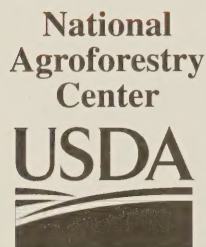
Want More Information?

Local Assistance

There are technical specialists in your area that can assist you with the planning, design, application, and maintenance of your Working Trees for Wildlife practice. Contact your nearest state wildlife agency, state forestry agency, USDA Natural Resources Conservation Service District Office, County Extension Office, or Soil and Water Conservation District.

National Assistance

Contact the USDA National Agroforestry Center (NAC), East Campus—UNL, Lincoln, NE 68583-0822. Telephone (402) 437-5178; or the NRCS – **Watershed Science Institute**, c/o Dept. of Soil Science, PO Box 7619, Raleigh, NC 27695-7619. Telephone (919) 515-4181; or the NRCS - **Wildlife Habitat Management Institute**, 100 Webster Circle, Suite 3, Madison, MS 39110. Telephone (601) 965-5888. Visit the NAC web site at www.unl.edu/nac.



A partnership of the
Forest Service and
Natural Resources
Conservation Service

This brochure was developed by the National Agroforestry Center (NAC) in cooperation with the Natural Resources Conservation Service, Watershed Science Institute and Wildlife Habitat Management Institute.

NAC's Mission: The National Agroforestry Center is a partnership of the USDA Forest Service, Research and Development (Rocky Mountain Research Station) and State & Private Forestry and the USDA Natural Resources Conservation Service. The Center's purpose is to accelerate the development and application of agroforestry technologies to attain more economically, environmentally, and socially sustainable land-use systems. To accomplish its mission, the Center interacts with a national network of cooperators to conduct research, develop technologies and tools, establish demonstrations, and provide useful information to natural resource professionals.

Address: USDA National Agroforestry Center, East Campus - UNL, Lincoln, Nebraska 68583-0822. For a supply of brochures, contact Nancy Hammond, nhammond/rmrs_lincoln@fs.fed.us. For more information on the Center, contact Jerry Bratton, 402-437-5178 ext. 24 or Bruce Wight, ext. 36.

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